

REMARKS

The Office Action mailed on December 4, 2002, has been received and reviewed.

Claims 1-37 and 52-56 are currently pending and under consideration in the above-referenced application. Each of claims 1-37 and 52-56 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 102(b)

Claims 1-37 and 52-56 stand rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent 5,987,739 to Lake (hereinafter "Lake").

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Lake describes a method for fabricating a polymer-based circuit. The method of Lake includes providing a polymer substrate 14 that carries a plurality of polymer-based circuits 12. Each polymer-based circuit 12 includes one or more electrical components, such as the illustrated and described battery 18, semiconductor die 20, and antenna 29. FIGs. 1 and 2; col. 3, line 26, to col. 4, line 30.

Among other things, the method of Lake includes encapsulation of each polymer-based circuit 12. FIGs. 2-5. Initially, the areas (e.g., polymer-based circuits 12) on the surface 50 of a polymer substrate 14 that are to be encapsulated may first be treated to promote adhesion of an encapsulant thereto. Col. 2, lines 16-19; col. 9, line 64, to col. 13, line 18. For example, portions of a surface 50 of the polymer substrate 14 may be exposed to ultraviolet (UV) radiation to promote adhesion of encapsulant material 30 thereto. *Id.* Thereafter, an encapsulant 30, such as a two part epoxy (col. 5, lines 29-31), may be disposed over the surface 50 of the polymer substrate and adhered to any adhesion-promoted areas thereof. *Id.* FIGs. 2-5; col. 5, line 23, to col. 6, line 30. The encapsulant 30 may then be partially (col. 5, lines 37-40) or fully cured (col. 5, lines 49-51) and the polymer-based circuits 12 that have been formed on the polymer

substrate 14 may be separated from one another (*Id.*). Although Lake indicates, at col. 5, lines 42–45, that the encapsulant 30 need not cover all of the components of a polymer-based circuit 12, each of the FIGURES in Lake shows the semiconductor dice 20 as being completely covered by the encapsulant 30.

Independent claim 1 of the above-referenced application recites a method for forming a protective layer on a semiconductor device. The method of independent claim 1 includes, among other things, “selecting at least one portion of [an] active surface” of a *semiconductor die* “to be covered with at least a first layer of protective material . . .” In addition, independent claim 1 recites that a layer of protective material on some portions of the active surface is “selectively alter[ed] . . . from [an] unconsolidated state to at least a semisolid state, while . . . protective material over *other* portions of [the] active surface [remains] in [the] unconsolidated state.” (Emphasis supplied).

It is respectfully submitted that Lake does not anticipate each and every element of independent claim 1, as is required to maintain a rejection under 35 U.S.C. § 102(b).

In particular, Lake lacks any express or inherent description of selecting a portion of a semiconductor die to be covered with protective material. Instead, the description of Lake is limited to selecting portions of a polymer substrate 14, which carries semiconductor dice 20 and various other electronic components, that are to be covered with an encapsulant 30. ①

Additionally, Lake neither expressly nor inherently describes “selectively altering” protective material from an unconsolidated state to an at least semisolid state. Rather, the description of Lake is limited to the use of materials which can only be generally altered (*e.g.*, by ② mixing of first and second parts) from an unconsolidated state to an at least semisolid state.

Further, rather than describe leaving a protective material on areas of an active surface of a semiconductor die in an unconsolidated state, Lake describes that the encapsulant material 30 that covers each semiconductor die 20 is fully cured and, thus, consolidated prior to severing the polymer-based circuits 12 on polymer substrate 14 from one another.

For these reasons, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 1 is allowable over Lake.

Claims 2-11 are each allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

Claim 4 is additionally allowable since Lake does not expressly or inherently describe “directing a controlled, discrete beam of radiation onto . . . protective material . . .” The reference to UV radiation in the Abstract of Lake merely refers to exposing areas of the polymer substrate 14 to UV radiation to subsequently enhance adhesion of encapsulant 30 thereto. This description does not amount an express or inherent description of directing a controlled, discrete beam of UV radiation.

Claim 5 depends from claim 4 and is also allowable since Lake lacks any express or inherent description of directing a controlled, discrete beam of UV radiation onto a layer of protective material to selectively alter the same.

Claim 7 is further allowable because the polymer substrate 14 described in Lake is not a “wafer having a plurality of semiconductor dice,” nor does Lake include any express or inherent description of providing a wafer that has a plurality of semiconductor dice. *no*

Claim 8 is additionally allowable since Lake does not expressly or inherently describe that the encapsulant 30 may be applied in a plurality of layers. Contrary to the assertion that has been made in the outstanding Office Action, references to curing the encapsulant 30 in stages and different thicknesses of encapsulant 30 at different locations on the polymer substrate 40 do not refer to multiple encapsulant 30 layers but, rather, merely to curing stages and the thickness of a single layer of encapsulant 30, respectively.

Claim 9 is further allowable because Lake neither expressly nor inherently describes removing unconsolidated encapsulant 30 from the polymer substrate 14.

Claim 11 is also allowable since Lake lacks any express or inherent description of “leaving protective material over . . . at least one bond pad” in an “unconsolidated state.”

The method of independent claim 12 includes “selecting at least one portion of [an] active surface of [one or more semiconductor dice] to be covered with [a] layer of protective material,” as well as “selectively altering [a] state of . . . protective material . . . over at least a portion of . . .

the active surface to at least a semisolid state, while leaving the protective material over *other* regions of the active surface in a substantially unconsolidated state.” (Emphasis supplied).

Again, Lake neither expressly nor inherently describes selecting a portion of a *semiconductor die* to be covered with protective material, “selectively altering” protective material from an unconsolidated state to an at least semisolid state, or leaving protective material on areas of an active surface of the semiconductor die in an unconsolidated state.

Therefore, Lake does not anticipate each and every element of independent claim 12. Accordingly, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 12 is allowable over Lake.

Claims 13-23 are each allowable, among other reasons, as depending either directly or indirectly from claim 12, which is allowable.

Claim 13 is additionally allowable since Lake does not expressly or inherently describe that the encapsulant 30 may be applied in a plurality of layers.

Claim 14 is further allowable because Lake neither expressly nor inherently describes removing unconsolidated encapsulant 30 from the polymer substrate 14. Instead, it appears that all of the encapsulant 30 that is placed on the polymer substrate 14 is consolidated.

Claim 16 is also allowable since Lake lacks any express or inherent description of singulating selected dice from a wafer. Instead, the description of Lake is limited to removing polymer-based circuits 12 from the other polymer-based circuits 12 that are carried by a polymer substrate 14.

Claim 17, which depends from claim 15, is allowable for the same reason as claim 16.

Claim 18 is additionally allowable because Lake only describes separating polymer-based circuits 12 from the remaining polymer-based circuits 12 on the polymer substrate *after* the encapsulant 30 has been fully cured. Col. 5, lines 49-51.

Claim 22 is also allowable since Lake lacks any express or inherent description of “leaving protective material over bond pads” in an “unconsolidated state.”

Claim 23 is additionally allowable since Lake does not expressly or inherently describe “subjecting . . . at least a portion” of the encapsulant 30 thereof “to a beam of radiation” to selectively alter the encapsulant 30.

Independent claim 24 recites a method that includes providing a semiconductor die with an active surface that is “attached to a lead frame of a lead frame strip,” “submerging the semiconductor die in liquid resin,” and “subjecting selected portions” of a layer of the liquid resin “to a controllable beam of radiation to change said liquid resin” in selected portions of the layer thereof “to an at least semisolid state.”

As Lake lacks any express or inherent description of providing a semiconductor die with an active surface that has been attached to a lead frame, of submerging the semiconductor die in a liquid resin, and of subjecting selected portions of a layer of the liquid resin “to a controllable beam of radiation,” it is respectfully submitted that Lake does not anticipate several of the elements of independent claim 24.

It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 24 is allowable over Lake.

Each of claims 25-32 is allowable, among other reasons, as depending either directly or indirectly from claim 24, which is allowable.

Claim 25 is further allowable because Lake neither expressly nor inherently describes “subjecting . . . selected portions” of a layer of liquid resin “to a beam of UV radiation.” Rather, the description of Lake is limited to subjecting portions of a surface 50 of a polymer substrate 14, *not* the encapsulant 30, to UV radiation to facilitate subsequent adhesion of encapsulant 30 thereto.

Claim 26 is additionally allowable since the data storage that is referred to in Lake does not comprise “storing data including at least one physical parameter of the semiconductor die in computer memory and using the stored data *in conjunction with a machine vision system* to recognize the location and orientation of the semiconductor die . . .” Rather, Lake merely describes that data regarding the intensity of UV radiation to which the polymer substrate 14 is exposed and the temperature of the polymer substrate 14 during such exposure may be stored.

Claim 27 is also allowable since Lake does not expressly or inherently describe the use of a machine vision system or stereolithographic formation of a layer of resin.

Claim 28 is further allowable since Lake lacks any express or inherent description of subjecting portions of a layer of liquid resin “other than” those at locations of leads to a controllable beam of radiation.

Claim 29 is additionally allowable because Lake neither expressly nor inherently describes forming a layer that at least partially underlies a lead frame.

The method of independent claim 33 includes, among other things, “recognizing a location and orientation of at least one selected die of [a] wafer and bond pads on the active surface of [the] at least one selected die,” submerging a platform on which the wafer is carried “in a liquid resin to a controlled liquid depth,” and “subjecting at least one selected portion of the liquid resin . . . to a discrete beam of focused radiation to alter [the] liquid resin . . . to at least a semisolid state . . .”

As indicated previously herein, Lake neither expressly nor inherently describes “recognizing” a location and orientation of at least one selected die of a wafer, “submerging” the die in a liquid resin, or “subjecting” any portion of a liquid resin “to a discrete beam of focused radiation . . .” Thus, Lake does not anticipate each and every element of independent claim 33.

Accordingly, it is respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 33 is allowable over Lake.

Claims 34-37 are each allowable, among other reasons, as depending either directly or indirectly from claim 33, which is allowable.

Claim 34 is additionally allowable since the data storage that is referred to in Lake does not comprise “storing data including at least one physical parameter of the semiconductor die in computer memory and using the stored data *in conjunction with a machine vision system* to recognize the location and orientation of the semiconductor die . . .” Rather, Lake merely describes that data regarding the intensity of UV radiation to which the polymer substrate 14 is exposed and the temperature of the polymer substrate 14 during such exposure may be stored for subsequent use or access.

Claim 35, which depends from claim 34, is further allowable since Lake lacks any express or inherent description of “merging . . . data for at least one physical parameter [of a]

semiconductor die with data for controlling and subjecting . . . liquid resin . . . to a discrete beam of focused radiation.”

Claim 36 is also allowable because Lake does not expressly or inherently describe “stereolithographically forming wafer supports on [a] platform to horizontally secure [a] wafer.”

Claim 37 is further allowable since Lake lacks any express or inherent description of “placing [a] wafer on [a] platform and stereolithographically forming semisolid edge supports securing an edge of the wafer to [the] platform.”

Independent claim 52 recites a method for securing a component of a semiconductor device assembly to another component of the semiconductor device assembly. The method of independent claim 52 includes providing a component that includes a support structure with a plurality of superimposed, contiguous, mutually adhered layers of material, and securing the component to another component with an outermost, adhesive layer of the plurality of superimposed, contiguous, mutually adhered layers.

No structure or component in Lake, not even the polymer substrate 14 thereof, is provided which includes a plurality of superimposed, contiguous, mutually adhered layers of material, *the outermost of which comprises an adhesive material*. Rather than include a layer of adhesive material, Lake describes that the surface 50 of the polymer substrate 14 may be treated so as to enhance adhesion of an encapsulant 30 thereto. Therefore, Lake does not anticipate each and every element of independent claim 52 and, under 35 U.S.C. § 102(b), independent claim 52 is allowable over Lake.

Each of claims 53-56 is allowable, among other reasons, as depending either directly or indirectly from claim 52, which is allowable.

Claim 54 is further allowable because Lake neither expressly nor inherently describes “heating at least portions of [a] thermoplastic material” of an outermost layer of the plurality of superimposed, contiguous, mutually adhered layers “to at least soften [the] thermoplastic material.”

Claim 55 depends from claim 54 and is also allowable since Lake does not expressly or inherently describe “substantially simultaneously with . . . heating at least portions of [the]

thermoplastic material, heating at least one conductive structure” of one component “to secure [the same] to a contact” of another component.

In view of the foregoing, withdrawal of the 35 U.S.C. § 102(b) rejections of claims 1-37 and 52-56 is respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 1-37 and 52-56 is allowable. An early notice of the allowability of these claims, as well as an indication that the above-referenced application has been passed for issuance, is respectfully solicited. If any issues preventing allowance the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



Brick G. Power
Registration No. 38,581
Attorney for Applicant(s)
TRASKBRITT, PC
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

Date: March 4, 2003

BGP/ps:djp

Document in ProLaw